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WHAT LEADS CUSTOMER TO DEFEND THE BRAND: THE ROLE OF GREEN INNOVATION AND PERCEIVED MARKETPLACE INFLUENCE

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This study employs a mixed-methods approach, integrating qualitative thematic analysis and quantitative structural equation modelling, to examine how green innovation activities influence consumer attitudes, purchase intentions, and brand defense behaviours. Qualitative findings from consumers' reports enrich the quantitative results by uncovering stronger motivations and emotional factors that shape their behaviour toward green products. Both qualitative and quantitative data confirm that companies pursuing a green innovation strategy, for example, the use of biodegrades and sustainable production practices, influence perceptions of a company's environmental responsibility. The green innovation activities of the company significantly influence the attitude and willingness to pay for green products by the young consumer with the use of green marketing tools that include clear communication, real certification, and direct sustainability claims. In addition, the results underscore the significant effect of brand reputation, transparency, and consumer trust as key foundations for generators in triggering the proactive brand defense from negative publicity. The study further emphasizes the role of emotional attachment and personal experience in reinforcing these protective behaviours.

Keywords: *Green innovation, green consumption, green purchase intention, brand defense.*

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1. INTRODUCTION

Green innovation (GI) has increasingly been recognized as a vital strategy for driving economic growth while safeguarding environmental sustainability. It not only solve limited resources and fulfills the environmental regulatory demand in emerging markets (Sheng & Ding, 2023), but also aligns with the global sustainable development agenda, thus attracting ecologically conscious customers, including a growing segment of younger consumers who have shown greater sensitivity to environmental issues in their purchasing decisions (Mehraj et al. 2023), and developing improved customer relationships (Cuerva et al., 2014; Martínez-Ros & Kunapatarawong, 2019). Furthermore, companies that aggressively pursue green innovation can significantly enhance their corporate reputation, preclude environmental risks, and achieve sustainable competitive advantages by positioning themselves as top and pioneering environmental stewards (Le & Govindan, 2024; Cuerva et al., 2014).

Most scholars have largely centred on firm-side effectiveness rather than its impacts on consumer attitudes and behaviours, especially in psychological and emotional processes through which consumers interpret and respond to firms' green innovation efforts (Sheng & Ding, 2023; Martínez-Ros & Kunapatarawong, 2019). Furthermore, studies show that the features of eco-friendly products can significantly improve consumers' perceptions and evaluations of brands (Ariffin et al., 2016; Bashir et al., 2020; Prakash et al., 2019). However, doubts persist regarding environmental claims in the absence of credible evidence (Torelli et al., 2020; Trivedi et al., 2018). As a result, the psychological and behavioural mechanisms linking GI to consumer outcomes remain insufficiently theorised, and a comprehensive framework integrating green innovation, induced cognition and behaviour has yet to be fully articulated.

Additionally, although considerable research emphasizes how brands enhance consumer engagement and encourage positive purchase behaviour, few studies investigate customer behaviours related to actively protecting or defending brands, especially within the context of green innovation (Ali et al., 2021). Given the increasing volatility of market environments and heightened brand sensitivity to negative information, understanding how green innovation can mobilize consumers not only to purchase but also actively defend and advocate for brands is crucial (Pham et al., 2024; Dalman et al., 2019).

Addressing these gaps, this study employed a mixed methodological approach, combining qualitative techniques (triangulation method) and quantitative Partial Least Squares (PLS) analyses on an exclusive sample of 502 young respondents in Vietnam. The empirical results confirm that green innovation is associated with enhanced customer attitudes toward green consumption (ATGC), environmental concerns (EC), and personal innovativeness (PI, which positively affect consumer behaviours such as green-brand purchase intention (GPI) and brand defense (BD). Notably, the current study differs from earlier work in the extent to which it emphasizes the multiple dimensions of consumer perceptions on market influence (PMI) and the conditionality of its moderation effects on environmental concern and perceived innovativeness's impact on consumer behaviours (Pham et al., 2024).

Specially, this study contributes to the understanding of the moderating role of perceived market influence (PMI), thereby extending previous research on how consumers' attitudes towards their market-shaping capability influence their responses to sustainability initiatives (Le & Govindan, 2024; Martínez-Ros & Kunapatarawong, 2019). While extant literature predominantly associated green innovation with greater consumer preference and improved firm performance (Cuerva et al., 2014; Sheng & Ding, 2023), the research adds new insights by highlighting its indirect role in enabling more emotional connections and inspiring engaged consumer behaviours such as brand defense.

2. LITERATURE REVIEW

2.1. Green innovation

The growing demand for green choices and pressures of government and societal institutions requires brands to adopt sustainable practices to achieve competitive advantages and comply with stricter regulations (Melander & Arvidsson, 2022; Boons et al., 2013). In this context, green innovation refers to the creation and implementation of ecologically friendly goods, procedures, managerial techniques, and organisational practices that collectively reduce environmental damage and promote sustainable development (Chen, 2008; Le & Govindan, 2024).

More recent empirical evidence also suggests that green innovation initiatives can trigger positive responses that precede pro-consumer behaviour (Khan et al., 2022), while increasing brand preference and loyalty (Le & Govindan, 2024). However, when consumers perceive a gap between a firm's green innovation claims and its actual practices, this mismatch can weaken trust, discourage participation, and diminish the likelihood that consumers will support or advocate for the brand, highlighting the conditional nature of GI-driven brand advocacy effects (Higueras-Castillo et al., 2024).

Despite extensive evidence on strategic benefits of green innovation, limited research examines how such initiatives shape consumer cognitive and affective responses, especially towards sustainability-oriented attitudes, purchasing intentions and willingness to actively defend green brands against negative information (Cuerva et al., 2014; Alnawas et al., 2023). Addressing this theoretical shortfall is essential not only for advancing academic understanding but also for providing brand managers with actionable insights to navigate evolving consumer attitudes and behaviours within sustainability-focused markets (Alnawas et al., 2023).

2.2. Green innovation, environmental concern, green purchase intention, brand defense

Recent studies suggest that green innovation, as a tangible expression of environmental responsibility, plays a key role in shaping consumer attitudes, by increasing the perception of eco-commitment and brand authenticity (Chen, 2008; Ali et al., 2021). Such initiatives positively influence attitudes toward green consumption and are closely associated with higher levels of environmental concern, as individuals become more aware of environmental problems and feel

more personal responsibility to tackle them (Dunlap & Jones, 2002; Kim & Choi, 2005). Accordingly, the following hypothesis is proposed:

Hypothesis 1: Green innovation activities positively influence environmental concern through attitude toward green consumption.

Growing environmental concerns among consumers are driving sustainable consumption and corporate sustainability integration (Dunlap & Jones, 2002; Kim & Choi, 2005; Mostafa, 2007). Prior studies indicated the significant role of environmental concerns in encouraging the pro-environmental intentions (Gansser & Reich, 2023; Naalchi Kashi, 2020) green purchasing (Bashir et al., 2020; Song et al., 2023), which are marketed as environmentally friendly (Prakash et al., 2019). Therefore, brands' effective communication of green innovation can enhance green purchase intention, especially among environmentally concerned consumers (Ciriello et al., 2018). Consumers' perceived threats to environmentally aligned brands further intensify purchase-based supports (Trivedi et al., 2018). Therefore, we propose the following hypothesis:

Hypothesis 2a: Green innovation activities positively influence green purchase intention through environmental concern.

Brand defense refers to consumers' tendency to protect and advocate for favored brands under threat (Torelli et al., 2020; Dalman et al., 2019). Customers with strong brand attachment are more likely to defend it against criticism (Monga & John, 2008). When customers are satisfied, they are eager to engage in positive word-of-mouth (Ilhan et al., 2018; Japutra et al., 2019), which can evolve into active brand defense (Wilk et al., 2020). Furthermore, prior studies suggest that alignment between brand values and consumers' environmental concerns fosters emotional bonds, thereby increasing consumers' willingness to support and defend the brand (Burton et al., 2018; Yu & Huo, 2019). Hence, the study proposes the hypothesis as follows:

Hypothesis 2b: Green innovation activities positively influence brand defense through environmental concern.

2.3. Green innovation, personal innovativeness, green purchase intention, brand defense

Previous studies of green innovation have focused primarily on its impact on consumers' environmental values, neglecting the effects on personal innovation, which refers to the propensity of consumers to seek out and adopt new products, particularly those that are in line with their personal beliefs and values (Midgley & Dowling, 1978; Roehrich, 2004). When brand's innovations are seen as credible and in line with sustainability principles, consumers tend to strengthen the positive attitude towards green consumption (Ali et al., 2021) and serve as a driver for exploratory behaviour and openness to eco-innovation (Hasudungan & Saragih, 2024). Thus, the following hypothesis is proposed:

Hypothesis 3: Green innovation activities positively influence personal innovativeness through attitude toward green consumption.

Brands pursuing green innovation are viewed as more trustworthy and progressive, subsequently enhancing customer perceptions and consumption, based on their subjective assessments compared to existing options (Lowe & Alpert, 2015; Hoeffler, 2003). Brand's communication on "green innovation", "social responsibility", and "cleaner production" positively influences consumers' sustainable perceptions, further strengthening green purchase intentions (Severo et al., 2018). Consumers, who are eager to embrace innovation, are more likely to choose a brand's products if they are aware that the brand has green innovation practices. Consequently, the following hypothesis is proposed:

Hypothesis 4a: Green innovation activities positively influence green purchase intention through personal innovativeness.

Individuals who demonstrate high levels of personal innovation are typically inclined to take risks and explore uncertain opportunities (Lewis et al., 2003; Lu et al., 2008), while embracing a positive attitude toward innovation (Lu et al., 2005). Brands perceived as innovative often emerge as industry leaders (Gatignon & Xuereb, 1997). When consumers perceive a brand as innovative, they are more inclined to defend it against criticism. This view of innovation improves their ability to make strong arguments to support the brand (Lyytinen et al., 2016). Therefore, we put forth the following hypothesis:

Hypothesis 4b: Green innovation activities positively influence brand defense through personal innovativeness.

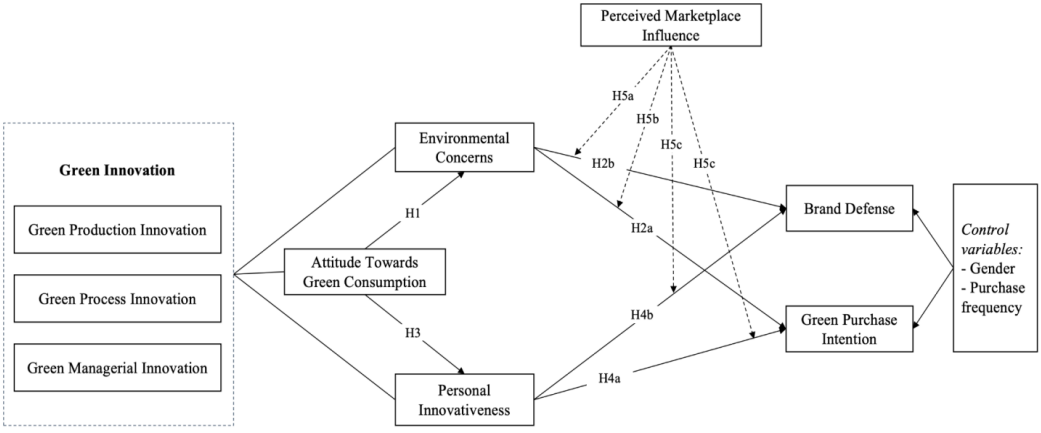
2.4. The moderating role of customer's perceived marketplace influence

Developing economies are experiencing a significant shift towards green consumption as environmental awareness grows. In contrast to other efficacy-focused models, perceived marketplace influence (PMI) captures a wide range of efficacy-driven motivational beliefs with its explicit marketplace focus (Leary et al., 2017). Furthermore, PMI states that purchasing eco-friendly items can significantly alter market dynamics and link to positive changes for the environment (Leary et al., 2014). This conviction motivates consumers to adopt socially responsible behaviours, including the selection of sustainable products. In sustainable consumption, the concept of PMI emphasizes the belief that their actions can lead to significant change or motivate sustainable behaviour, rather than solving a problem individually (Leary et al., 2014).

The organization's engagement with green innovation enhances environmental awareness and individual innovativeness. Previous research indicates that consumers' perceptions of the marketplace significantly influence their green purchase intention (Joshi et al., 2021) and their brand engagement (Leary et al., 2017). By strengthening consumers' belief that their marketplace actions can affect meaningful change, PMI drives green purchase intentions and brand defense, in response to green innovation (Joshi et al., 2021; Leary et al., 2017). This study examines PMI as the customer's belief reinforces the value of environmental concern and personal innovativeness toward green consumption behaviours in buying products and protecting brands. Hence, we posit the hypotheses as follows:

Hypothesis 5a-d: Customer's perceived marketplace influence moderates the relationship between environmental concern and green purchase intention; environmental concern and brand defense; personal innovativeness and green purchase intention; personal innovativeness and brand defense.

Figure 1: Proposed research framework



3. METHODOLOGY

3.1. Data collection and sample

The study employed a convenience sampling technique to get voluntary participants who were acquainted with or had some knowledge about green products. Those lacking such familiarity or providing low-quality responses were excluded through initial screening. To maintain data quality, answers were stringently screened, which excluded speeders (participants who provided straight-lined answers). To ensure response relevance, participants selected a green product category and brand with which they were most familiar before completing the survey, from personal use (e.g., cosmetics, food) to larger lifestyle or infrastructure choices (e.g., green energy, building materials).

The study focuses on investigating young Vietnamese consumers, specifically Generation Z, represent a growing segment within the green consumption space. The final sample had 502 participants, primarily between 18 and 28 years of age, who have sensitivity to environmental issues, which are all relevant factors in green purchasing behaviour (Uddin & Khan, 2018). As reported in Appendix 1, the respondents were 57.77% female and 42.23% male, a demographic profile typical of Gen Z in Vietnam and in line with the goal of the study to understand green consumption decisions of young, environmentally conscious digital natives. Moreover, the sample data analysis shows a diverse pattern of consumer participation across different types of green products, including high participation in green cosmetics and green food and beverages and the

majority of respondents report buying green products only one to two times per year, comprising 42.03% of participants.

3.2 Measurement

All measurement items were adopted and adapted from validated instruments used in previous research. Green innovation (GI), conceptualized as green product, process, and managerial innovation, was adopted from Wang (2019). Attitude toward green consumption (ATGC) and environmental concern (EC) were measured following Duarte et al. (2024), while personal innovativeness (PI) was assessed modified from Agarwal and Prasad (1998). Green purchase intention (GPI) items were adopted from Ali et al. (2020), perceived marketplace influence (PMI) from Leary et al. (2014) and Joshi and Rahman (2019), and brand defense (BD) from Harrigan et al. (2021). All constructs were measured on a seven-point Likert scale ranging from 1 ("strongly disagree") to 7 ("strongly agree"). A summary of the measurement items is presented in Appendix 2.

4. RESULTS AND DISCUSSION

4.1. Common method bias

In terms of statistical controls, Harman's single-factor test revealed that the first factor explained only 44.02% of the total variance (Podsakoff et al., 2003). Additionally, the full collinearity test conducted by Kock and Lynn (2012) revealed that all FCVIF values remained below the critical threshold of 3.3 (refer to Table 1), indicating an absence of both vertical and lateral collinearity.

Table 1: Full collinearity test

	PROD	PROC	MA	ATGC	EC	PI	BD	GPI
FCVIF	2.334	2.113	1.766	1.786	2.123	2.038	2.280	2.351

***Note**:* FCVIF = Variance Inflation Factor values in a full collinearity test (Kock and Lynn, 2012).

4.2. Measurement model assessment

The stage 1, the study assess the reflective measurement models. Item reliability was established as all indicator loadings exceeded the recommended threshold of 0.70 (Hair et al., 2019) (Appendix 1). Convergent validity were confirmed as Cronbach's alpha values, and AVE exceeded recommended thresholds. The measurement model was further supported by the variance inflation factors (VIFs) below 5, indicating no multicollinearity issues among dimensions (Hair et al., 2014). Furthermore, discriminant validity was established using both the Fornell–Larcker criterion (Appendix 3) and HTMT ratios (Appendix 4), with all constructs empirically distinct (Fornell & Larcker, 1981; Henseler et al., 2015).

In Stage 2, GI was modelled as reflective-formative higher-order constructs using latent variable scores from its lower-order components (Sarstedt et al., 2016). The analysis of the formative

measurement models for potential collinearity issues indicated that multicollinearity is not a major concern. Bootstrapping results indicated that all HOCs' weights were statistically significant (Appendix 5). Furthermore, outer loadings were found to be greater than 0.50 across all lower-order constructs. The evaluation validated the significance of the identified higher-order constructs, with all associated lower-order components preserved in the outer model.

4.3. Structural model assessment

The designated structural model requires an initial assessment of potential collinearity to avoid biased estimates. Following this, the evaluation will centre on the model's explanatory capacity, predictive validity, and the importance of the path coefficients.

Table 2: Structural model assessment

Description	Path coefficient	Standard error	P-value	VIF	f^2
GI → ATGC	0.567	0.038	0.000	1.000	0.475
GI → EC	0.251	0.047	0.000	1.475	0.092
GI → PI	0.327	0.051	0.000	1.475	0.103
ATGC → EC	0.558	0.042	0.000	1.475	0.454
ATGC → PI	0.286	0.045	0.000	1.475	0.079
EC → BD	0.116	0.034	0.023	1.924	0.017
EC → GPI	0.324	0.049	0.000	1.924	0.118
PI → BD	0.326	0.049	0.000	1.613	0.161
PI → GPI	0.314	0.050	0.000	1.613	0.132
PMI → BD	0.426	0.051	0.000	1.896	0.234
PMI → GPI	0.173	0.051	0.001	1.896	0.034

Endogenous construct	Explanatory power		Predictive relevance	
	R^2	R^2 adjusted	Stone-Geisser's Q^2	Q^2predict
ATGC	0.322	0.321	0.22	0.315
EC	0.534	0.532	0.397	0.317
PI	0.295	0.292	0.212	0.233
BD	0.592	0.586	0.394	0.492
GPI	0.539	0.532	0.41	0.369

Note: *p < 0.05; **p < 0.01; ***p < 0.001; p> 0.05 – non-significant at the 5% significance level; Bootstrapping procedure (5,000 sub-samples; No Sign Change option; two-tailed test) was applied.

The analysis showed that all VIF values for the combinations of endogenous and exogenous constructs were below the recommended maximum of 3 (see Table 2). The model's explanatory power is widely assessed by the coefficient of determination R^2 in table 2. Of all three key outcome constructs, the PLS path model explained 53.9% of the variance in GPI construct and 59.2% of the variance in BD construct. The model's predictive relevance was assessed using the Q^2 values derived from the blindfolding procedure, the Q^2 value of 0.410 particularly indicated large predictive relevance of the model. The study also used PLSpredict (Hair et al., 2022) to test the predictive capacity of the observed variables. In addition, to measure the model's fit, SRMR value was calculated at 0.059, which is less than 0.08 (Hu & Bentler, 1999), which is considered a good fit.

4.4. Mediating analysis

Table 2 presents the results of the indirect effect hypotheses using bootstrapped SEM analysis.

First, GI significantly increases EC through ATGC, supporting H1 ($\beta = 0.317$, $t = 8.543$, $p < 0.001$). GI also indirectly enhances green purchase intention (GPI) (H2a) and brand defense (BD) (H2b) via EC, (H2a: $\beta = 0.081$, $t = 5.421$, $p < 0.001$; H2b: $\beta = 0.029$, $t = 2.059$, $p = 0.040$). Similarly, GI significantly increases PI through ATGC, supporting H3 ($\beta = 0.162$, $t = 5.217$, $p < 0.001$). PI further mediates the effects of GI on both GPI (H4a) and BD (H4b), indicating that consumers with higher innovativeness are more likely to adopt and defend green products in response to green innovation efforts (H4a: $\beta = 0.103$, $t = 4.599$, $p < 0.001$; H4b: $\beta = 0.107$, $t = 4.331$, $p < 0.001$).

Regarding moderating effects, PMI significantly strengthens negative indirect relationship between EC and GPI, supporting H5a ($\beta = –0.095$, $t = 2.300$, $p = 0.021$ This indicates reduced green purchase intention among environmentally concerned consumers with low perceived marketplace influence. However, H5b and H5c were not supported, as the interaction effects were non-significant. In contrast, H5d was supported ($\beta = 0.094$, $t = 2.022$, $p = 0.043$), indicating that PMI positively moderates the relationship between PI and BD. This means consumers who feel influential are more likely to defend green brands when they are personally innovative.

Table 3: Structural model path coefficients testing results (indirect effects)

Hypothesis	Description	Path coefficient	t-value	p-value	Confidence interval		Decisions
					2.5%	97.5%	
H1	GI → ATGC → EC	0.317	8.543	0.000	0.247	0.391	Supported
H2a	GI → EC → GPI	0.081	5.421	0.000	0.053	0.112	Supported
H2b	GI → EC → BD	0.029	2.059	0.040	0.004	0.059	Supported
H3	GI → ATGC → PI	0.162	5.217	0.000	0.103	0.226	Supported
H4a	GI → PI → GPI	0.103	4.599	0.000	0.062	0.150	Supported
H4b	GI → PI → BD	0.107	4.331	0.000	0.063	0.159	Supported

Hypothesis	Description	Path coefficient	t-value	p-value	Confidence interval		Decisions
					2.5%	97.5%	
H5a	PMI x EC → GPI	-0.095	2.300	0.021	-0.173	-0.013	Supported
H5b	PMI x EC → BD	-0.067	1.624	0.104	-0.145	0.016	Not supported
H5c	PMI x PI → GPI	0.037	0.678	0.498	-0.070	0.138	Not supported
H5d	PMI x PI → BD	0.094	2.022	0.043	0.002	0.184	Supported

Note: The null hypothesis of constant variance was rejected if the p-value is lower than 0.05 (Hair Jr. et al., 2017). In this table, GI refers to Green Innovation, EC refers to Environmental Concern, ATGC refers to Attitude towards green consumption, PMI refers to Perceived Marketplace Innovation, EC to Environmental Concerns, PI to Personal Innovativeness, BD to Brand Defense, and GPI to Green Purchase Intention.

These results indicate that ATGC, EC, and PI serve as the primary pathways through which eco-innovation impacts consumer behaviour. Specifically, green innovation enhances pro-environmental attitudes and awareness, which subsequently translate into stronger green purchase intentions and brand defense behaviours. Moreover, PI mediates this relationship by increasing receptiveness to green innovation and supportive responses toward eco-friendly brands (Sheng & Ding, 2023).

Beyond these mediating pathways, the results also underscore the conditional role of PMI. While higher PI strengthens consumers' willingness to defend green brands, heightened environmental concern may simultaneously amplify scepticism toward green marketing claims, thereby constraining purchase intentions. This finding suggests that PMI operates as a critical boundary condition, shaping whether green innovation efforts translate into favourable consumer responses.

4.5. Post-hoc analysis

Following Denzin (1978) and Siamagka et al. (2015), this study employed qualitative triangulation to complement PLS-SEM results through context-specific mechanism identification (Creswell & Creswell, 2017; Venkatesh et al., 2016). After the main survey, participants completed three open-ended questions on environmental beliefs, green motivations, and brand-defense rationales. Following data screening, 275 valid responses were retained for qualitative analysis, with respondent demographics consistent with the quantitative sample; the identified themes are presented in Appendix 6.

The data were analysed using inductive template analysis, supported by reflexive rigor and peer debriefing (King, 1998; Braun & Clarke, 2021), and further validated through bibliometric mapping using VOSviewer to enhance robustness (Aria & Cuccurullo, 2017; Donthu et al., 2021).

The qualitative findings complement quantitative results by elucidating psychological mechanisms behind consumer responses to green innovation. While quantitative analyses confirm the effects of product, process, and managerial innovations on green purchase intentions and brand defense (Beneke et al., 2015; Choi, 2016; Ali et al., 2021), qualitative insights show how consumers internalize these practices by associating recycling, biodegradable materials, and waste reduction

with ecological and personal-health benefits. These findings align with bibliometric evidence identifying environmental protection, health, and product quality as central themes in green consumption research (Cuerva et al., 2014; Oduro et al., 2022).

Similarly, the qualitative data highlight brand transparency, credibility, and authentic communication as decisive factors shaping consumers' attitudes and willingness to defend green brands. These findings reveal that emotional attachment, experiential trust, and perceived sincerity of sustainable actions strengthen consumers' readiness to protect brands from negative information.

Furthermore, participants emphasized utilitarian and hedonic value in shaping purchase intentions, consistent with quantitative links between innovation constructs and consumer choice. Yet, qualitative insights indicate that these evaluations are embedded within broader socio-psychological judgments related to "trust," "brand reputation," and "consumer commitment."

Collectively, the qualitative findings deepen theoretical understanding by identifying the emotional, relational, and symbolic layers underlying green consumption behaviour. They refine the interpretation of quantitative pathways and suggest that future green innovation models should integrate psychological constructs such as brand love, trust, and community engagement to more comprehensively explain green purchasing and brand defense behaviours (Le & Govindan, 2024; Martínez-Ros & Kunapatarawong, 2019; Ali et al., 2021).

5. IMPLICATIONS AND LIMITATIONS

Green innovation strategy encourages firms to invest in environmentally oriented technologies and sustainable production systems, thereby contributing to SDG 9. Given the dual emphasis on sustainability and innovation within the business landscape, the finding reinforces the role of green innovation in driving customer green purchase intention and brand defense, which strengthens responsible consumption patterns and reinforces market demand for sustainable products, aligning with SDG 12.

5.1. Theoretical implications

First, instead of highlighting the role of environmental concern and personal innovativeness as antecedents impacting behaviours toward green consumption (Hasudungan & Saragih, 2024; Chauhan et al., 2021), the study examines these factors as mediating mechanisms of personal motives within the context of green innovation.

Second, green innovation boosts consumer perceptions of eco-friendly products, cultivating a profound sense of environmental concern and inspiring personal innovativeness. Additionally, research on green innovation predominantly highlights the importance of brand equity and consumer loyalty; however, the aspect of brand defense among environmentally conscious early adopters has not received adequate attention. Companies that advocate for and advance green innovation typically associates its brand with a strong commitment to sustainability and pioneering ideas (Chen & Chang, 2013).

Third, the study reveals a substantial moderating effect of perceived marketplace influence on their environmentally conscious behaviours, which encompass intentions to buy eco-friendly products and advocate for brands. By shifting away from the finding earlier studies that focus perceived marketplace in direct or mediating role (Leary et al., 2014; Joshi et al., 2021), this research enhances the discourse by confirming Hoang and Tung (2024) assertion about the moderating influence of perceived marketplace influence in emerging markets, especially in the context of green innovation and brand defense.

Finally, in the context of companies that implement green innovation strategies, the prevailing consumer skepticism towards marketing signals a distrust in sustainability innovation claims (Obermiller & Spangenberg, 1998). However, PMI enhances the impact of personal innovativeness on brand defense toward green consumption. Innovators feel a stronger sense of purpose and satisfaction when they see their actions impact the marketplace, making them more likely to stand by their chosen brands when they believe their support matters.

5.2. Managerial implications

Marketers should focus on brand transparency, innovation, and consumer trust via clear communication, showcasing firm's sustainable practices and efforts to enhance the credibility of green innovation and effectively tackle consumer skepticism (Chen & Chang, 2013). Firms also should communicate their green innovation efforts transparently, through clear eco-labels, credible certifications, and sustainability reporting, which increases consumer confidence and amplifies the impact of eco-innovation on attitudes and behavioural intentions (Huang, 2024; Liu, 2025).

Furthermore, emphasizing individual actions can enhance consumer market power perception, supporting sustainable behavior (Leary et al., 2014). Hence, brands must prioritize educating consumers about the environmental advantages of green innovation products and their contribution to sustainability (Chen & Chang, 2013; Oduro et al., 2022). In specific, green loyalty schemes - such as eco-friendly purchasing rewards or participation in sustainability initiatives - can further increase consumer involvement and advocacy (Ali et al., 2021).

Moreover, innovative consumers advocate for new approaches, especially when aware of their impact. By integrating customers into processes, organizations can significantly enhance their green innovation efforts (Zhong & Um, 2025). Early product access and feedback from initial adopters enhance advocacy (Ali et al., 2021; Alnawas et al., 2023). Furthermore, companies can promote pro-environmental behavior by highlighting environmental benefits and emotional attachment, such as launching a reward program, ambassador program, co-creation program for their sustainable actions impacting to community. Additionally, when promoting green innovation practices, it is essential to take into account consumers' personal health improvements and potential cost savings.

From a policy perspective, the findings suggest that policymakers could strengthen regulations governing environmental claims and eco-labels in digital and social media environments, while incentivizing firms to pursue green innovation (Chen & Chang, 2013). Clear standards and stricter oversight of green claims can reduce information ambiguity and green washing risks, enhance trust,

and enable young consumers to more confidently translate their sustainability preferences into actual purchasing behaviours (Thøgersen, 2000).

5.3. Limitations and future research

This study has several limitations that provide avenues for future research. First, the sample was exclusively of Generation Z consumers, which limits the generalization of the findings to other demographic groups. Second, the study examined consumer self-reported perceptions, acknowledging the concern of biases and subjectivity into the findings. Thirdly, the cross-sectional design of the study prevents strong causal conclusions on the mediating role of attitude and environmental concerns.

Future research should address these limitations using diversified sampling approach or longitudinal methods to verify PMI's moderating effects and explore changes in consumer behaviour over time. In addition, examining other influencing factors such as consumer education, sustainability awareness, or emotional engagement could enhance our understanding of the diverse consumer reactions to green innovations. This would help businesses gain practical insights to improve their competitive advantage through green innovation and achieve better sustainability outcomes.

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APPENDIX

Appendix 1: Sample demographics

Sample characteristics	Items	Frequency	Percent
Gender	Male	212	42.23%
	Female	290	57.77%
Category	Green cosmetic	217	43.23%
	Green fashion	25	4.98%
	Green food and beverages	135	26.89%
	Home appliances	16	3.19%
	Green transportation	49	9.76%
	Green energy and appliances	42	8.37%
	Green building materials	18	3.59%
Purchase frequency	1-2 times/year	211	42.03%
	3-5 times/year	158	31.47%
	6-10 times/year	43	8.57%
	Over 10 times/year	42	8.37%
	Never purchased green products	48	9.56%

Appendix 2: Item loadings, constructs reliability, and validity

Item	Loading	Mean	VIF	AVE	rho_A	CA	CR
Green Innovation				0.574	0.895	0.893	0.915
Green Production Innovation				0.653	0.737	0.735	0.850
PROD1: Less polluting, toxic material use.	0.798	5.345	1.464				
PROD2: Improve environmentally friendly product packaging.	0.831	5.480	1.511				
PROD3: Recover firm's end-of-life products.	0.796	4.954	1.401				
Green Process Innovation				0.734	0.819	0.819	0.892
PROC1: Low energy consumption during production.	0.865	5.195	1.930				
PROC2: Uses recycled, reused, remanufactured materials.	0.842	5.369	1.726				
PROC3: Uses cleaner technology, prevents pollution.	0.862	5.468	1.844				
Green Managerial Innovation				0.811	0.769	0.768	0.896
MA1: Redefine operation, ensure internal efficiency.	0.905	5.412	1.633				
MA2: Re-design product meet environmental criteria.	0.896	5.564	1.633				
Attitude Toward Green Consumption				0.702	0.896	0.892	0.921
ATCG1: Favourable attitude toward green product.	0.856	6.010	2.624				
ATCG2: Use green product good environment.	0.885	5.926	3.110				
ATCG3: Sensible to use green product.	0.858	5.890	2.536				
ATCG4: Nice to use green product.	0.868	5.847	2.651				
ATCG5: Green product just as safe.	0.709	5.645	1.504				
Environmental Concerns				0.751	0.89	0.889	0.923
EC1: Environment is my biggest concern.	0.867	5.480	2.393				
EC2: Concerned about environment quality deterioration.	0.861	5.749	2.481				
EC3: Emotionally involved environmental protection issues.	0.889	5.667	2.793				
EC4: Think how environment quality improves.	0.849	5.428	2.179				

Item	Loading	Mean	VIF	AVE	rho_A	CA	CR
Personal Innovativeness				0.736	0.831	0.82	0.893
PI1: Look for ways to experiment.	0.893	5.239	2.106				
PI2: Like to experiment new products.	0.869	5.412	2.011				
PI3: First to explore new products.	0.809	4.669	1.611				
Green Purchasing Intention				0.774	0.903	0.903	0.932
GPI1: Intend to purchase due to environmental concern.	0.877	5.540	2.609				
GPI2: Expect purchase for environmental performance.	0.907	5.649	3.234				
GPI3: Glad to purchase environmentally friendly.	0.890	5.695	2.848				
GPI4: Willing to buy environmental performance.	0.844	5.616	2.129				
Brand Defense				0.681	0.942	0.941	0.951
BD1: Refuse to believe their criticism.	0.776	5.032	2.292				
BD2: Argue for my brand.	0.825	4.900	3.095				
BD3: Try to protect my brand.	0.878	5.016	3.684				
BD4: Refer to strongest brand points.	0.807	5.394	3.060				
BD5: Convince them strong brand points.	0.799	5.343	2.552				
BD6: Protect brand against any criticism.	0.841	4.888	3.413				
BD7: Not let people criticize brand.	0.827	4.867	3.272				
BD8: Realize brand has better features.	0.815	5.267	2.751				
BD9: I will defend my brand.	0.855	5.215	3.122				
Perceived Marketplace Influence				0.738	0.826	0.823	0.894
PMI1: Individual efforts persuade others purchase.	0.858	5.349	1.772				
PMI2: Choices influence company make, sell.	0.874	5.275	1.974				
PMI3: Buy environmentally friendly, more introduced.	0.845	5.329	1.840				

Abbreviations: AVE, Average variance extracted; CA, Cronbach's alpha; CR, Composite reliability; VIF, variance inflation factor.

Appendix 3: Fornell- Larcker discriminant analysis.

	ATSP	**BD**	**EC**	**GEN**	**GI**	**GPI**	**MA**	**PI**	**PMI**	**PROC**	**PROD**
ATSP	0.838										
BD	0.467	0.825									
EC	0.701	0.557	0.867								
GEN	0.011	-0.093	0.012	1.000							
GI	0.564	0.563	0.563	-0.072	0.757						
GPI	0.697	0.586	0.638	-0.011	0.552	0.880					
MA	0.524	0.473	0.528	-0.061	0.865	0.530	0.901				
PI	0.471	0.646	0.516	-0.055	0.491	0.607	0.415	0.858			
PMI	0.601	0.694	0.619	-0.016	0.564	0.583	0.521	0.575	0.859		
PROC	0.495	0.500	0.487	-0.085	0.909	0.481	0.687	0.431	0.481	0.857	
PROD	0.491	0.527	0.494	-0.044	0.892	0.470	0.675	0.463	0.510	0.699	0.808

Appendix 4: Heterotrait-Monotrait Ratio (HTMT) discriminant analysis

	ATSP	**BD**	**EC**	**GEN**	**GPI**	**MA**	**PI**	**PMI**	**PROC**	**PROD**
ATSP										
BD	0.508									
EC	0.786	0.604								
GEN	0.030	0.097	0.015							
GI	0.633	0.614	0.630	0.076						
GPI	0.775	0.631	0.712	0.036						
MA	0.636	0.554	0.640	0.069	0.638					
PI	0.545	0.736	0.598	0.062	0.700	0.518				
PMI	0.702	0.786	0.721	0.024	0.673	0.658	0.695			
PROC	0.581	0.569	0.570	0.094	0.558	0.863	0.522	0.586		
PROD	0.608	0.634	0.609	0.052	0.576	0.895	0.594	0.655	0.900	
PMI x EC	0.403	0.227	0.427	0.110	0.370	0.324	0.249	0.274	0.245	0.254

Appendix 5: Measurement model assessment of Reflective-Formative HOC

HOC	LOC	VIF	Outer weight	P-value	95% CI	Outer loading
GI	PROD	2.273	0.381***	0.000	[0.218; 0.533]	0.889***
	PROC	2.342	0.299***	0.000	[0.132; 0.461]	0.870***
	MA	2.203	0.443***	0.000	[0.295; 0.592]	0.906***

Note: *GI = Green Innovation; HOC = High-order construct; LOC = Lower-order component; VIF = Variance Inflation Factor; *p < 0.05; **p < 0.01; ***p < 0.001; > 0.05 – non-significant at the 5% significance level;*
Bootstrapping procedure (5,000 sub-samples; No Sign Change option; two-tailed test) was applied; 95% CI = 95% percentile bootstrap confidence interval of the outer weights)

Appendix 6: Qualitative analysis

Question 1: Why do you believe that using green products will protect the environment?		Question 2: Why do you consume green products?		Question 3: Why are you willing to defend a green brand	
Theme	**Occurrences**	**Theme**	**Occurrences**	**Theme**	**Occurrences**
Environment protection	118	Product Price	69	Brand Transparency	41
Recycled material/Waste	53	Human health	31	Product Quality	39
Human health	42	Environment protection	30	Personal trust	20
Product quality	22	Product quality	25	Environment protection	16
Positive impact	10	Brand commitment	15	Brand Commitment	9
Environment pollution	8	Product cost	10	Green product	8
Friendly material	7	Product efficiency	10	Brand reputation	7